

**REMARKS**

Claims 1-30 were originally submitted.

Claims 9, 10, and 22 are canceled.

Claims 31-38 have been submitted in a previous response.

Claims 1-8, 11-21, and 23-38 remain in this application.

**Objection**

The Examiner has objected to claim 7 because of an informality; however, Applicants believe that claim 7 is grammatically correct as it currently is written.

**35 U.S.C. §103****Claims 1, 4, and 5**

Claims 1, 4, and 5 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,111,757 to Dell et al (Dell). Applicants respectfully traverse the rejection.

Dell describes a memory module configured such that it can be operated either as a SIMM (single in-line memory module) or as a DIMM (dual in-line memory module), depending on the type of socket into which it is inserted.

As shown in Dell's Fig. 1, the memory module has connectors formed along opposite edges. One of the connectors is for use with a SIMM socket, and the other connector is for use with a DIMM socket. Components on the memory module are coupled to one or the other of the connectors, depending on whether the memory module is emulating a SIMM or a DIMM. So-called "pass gate circuits" 28 control whether the memory components are coupled to the SIMM connector or the DIMM connector. Only one of the two connectors is used at any

1 given time. The memory module is not configured to allow communications from  
2 one of its connectors to the other.

3 **Claim 1** recites, in part:

4 a plurality of channels extending between the opposite edges,  
5 wherein each of the plurality of memory devices is coupled to one of  
6 the plurality of channels; . . .

7 Dell does not disclose or suggest channels having the recited  
8 characteristics.

9 In arguing that Dell discloses channels extending between edges, the  
10 Examiner refers generally to Dell's Fig. 1. However, Fig. 1 does not show  
11 memory devices that are coupled to channels extending between the edges.  
12 Furthermore, the Examiner has not indicated which of the numerous signal paths  
13 of Fig. 1 might comprise channels as recited in claim 1.

14 In the absence of any specific indication in the Office Action, it is assumed  
15 that the Examiner is referring to the connection of memory device D1 to a  
16 conductor that branches in two directions. Specifically, this conductor branches to  
17 edge 18 and to pass gate device 28—but not to edge 20. Thus, this conductor *does*  
18 *not* "extend between the opposite edges" as recited in claim 1.

19 Furthermore, Fig. 1 is a simplification of Dell's actual configuration. The  
20 configuration is shown in more detail in Fig. 2. A careful study of Fig. 2 reveals  
21 no conductors that extend between edges of the memory module. This is because  
22 each conductor is interrupted by a pair of complementary transistors (which form  
23 the pass gate devices), at least one of which is "off" at any given time. Transistors  
24 30a and 30b are an example of such a pair. Dell clearly states, at col. 5, lines 28-  
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1 40, that only one transistor of each pair conducts at any given time. Thus, there is  
2 no conductor that extends from one edge to the other.

3 Claim 1 also recites:

4 electrical contacts at the opposite edges of the substrate  
5 configured to allow communications through the channels via the  
6 electrical contacts.

7 *The Office Action does not address this element of claim 1.* Dell clearly  
8 does not contemplate communication between opposite edges. Dell specifically  
9 teaches that one or the other of the electrical connectors will be used *exclusively* at  
10 any given time. This teaches away from the claimed feature of allowing  
11 communications through channels that extend between opposite edges.  
12 Furthermore, the complementary transistors discussed above *preclude*  
13 *communications between edges of the memory module.*

14 For at least these reasons, Dell does not suggest the elements of claim 1.  
15 Accordingly, the rejection of claim 1 is improper, and should be withdrawn.

16 Dependent claims 4 and 5 depend from and comprise all the elements of  
17 claim 1. As such, dependent claims 4 and 5 are allowable by virtue of their  
18 dependency on base claim 1. Applicants respectfully request that the §103  
19 rejection of claims 3 and 11 be withdrawn.

20 **Claims 2, 3, and 6**

21 Claims 2, 3, and 6 are rejected under 35 U.S.C. §103(a) as being  
22 unpatentable over Dell in view of U.S. Patent 6,111,757 to Smith (Smith).  
23 Applicants respectfully traverse the rejection.  
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1        **Dependent claims 2, 3 and 6** depend from and comprise all the elements  
2 of claim 1. As such, dependent claims 2, 3 and 6 are allowable by virtue of their  
3 dependency on base claim 1. In rejecting these claims, Smith is additionally cited  
4 for disclosing "a memory module include a substrate [25] having a first and  
5 second sides with the plurality of memory devices and channel conductors  
6 disposed on both sides thereof". Smith, however, is not cited as providing any  
7 suggestion of channels extending between edges or of communications between  
8 edges of a memory module. Accordingly, claims 2, 3, and 6 are allowable for the  
9 at least reasons already discussed. Applicants respectfully request that the §103  
10 rejection of claims 2, 3 and 6 be withdrawn.

11  
12        **Claims 7, 8, 11-21, and 23-38**

13        Claims 7, 8, 11-21, and 23-38 are rejected under 35 U.S.C. §103(a) as being  
14 unpatentable over Dell in view of U.S. Patent 5,708,297 to Clayton (Clayton).  
15 Applicants respectfully traverse the rejection.

16        **Claim 7** recites, in part:

17                a first substrate having ... a first channel portion extending  
18 across ... opposite ends and contacts at the opposite ends to allow  
19 communications through the first channel portion via the contacts at  
the opposite ends of the first substrate;

20                a second substrate having ... a second channel portion  
21 extending across ... opposite ends and contacts at the opposite ends  
22 to allow communications through the second channel portion via the  
contacts at the opposite ends of the second substrate; ...

23        The Examiner rejects claim 7 based on the same arguments as claim 1  
24 citing Dell. Applicants reassert the arguments above supporting claim 1, and  
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1 particularly as discussed above, that Dell does not disclose or suggest channels  
2 extending across the substrate that provide communications through the channels.

3 **Claim 7** also recites:

4 a first connector configured to communicatively couple the  
5 first channel portion to the second channel portion...

6 Dell discloses a single substrate. The Examiner cites Clayton as disclosing  
7 "an assembly comprising a first and substrates [32, figure 1] each having a  
8 plurality semiconductor devices [54] thereon; contacts [60] mounted at each end  
9 of the substrates; a plurality of channels [50] interconnected between the contacts  
10 and the semiconductor devices; and a connector [51] configured to  
11 communicatively couple the first and second channels through the contacts of the  
12 first and second substrates wherein the first connector engages contact at the end  
13 of the first substrate and engages contacts at a first of the end of the second  
14 substrate".

15 The "channels" disclosed in Clayton are laminate circuits configured to  
16 connect the semiconductor devices 54. There is no suggestion or teaching that such  
17 laminate circuits may act as channels that extend across the substrates. Clayton  
18 discloses a connector that may connect semiconductor devices of one substrate to  
19 semiconductor devices of another substrate; however, there is no suggestion or  
20 teaching that the connector of Clayton couples channel portions as recited in claim 7.  
21 Therefore, in light of what is disclosed in Dell, there is no suggestion that the  
22 memory module of Dell may be combined with the subassemblies disclosed in  
23 Clayton to suggest or teach the elements disclosed in claim 7.  
24  
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1 For at least these reasons, the combination of Dell and Clayton does not  
2 suggest the elements of claim 7. Accordingly, the rejection of claim 7 is improper,  
3 and should be withdrawn.

4 **Dependent claims 8, 11, 12-20** depend from and comprise all the elements  
5 of claim 7. As such, dependents claims 8, 11, 12-20 are allowable by virtue of  
6 their dependency on base claim 7. Applicants respectfully request that the §103  
7 rejection of claims 8, 11, 12-20 be withdrawn.

8 **Claim 21** recites in part:

9  
10 a first connector coupling the first memory module to the  
11 second memory module through contacts at first ends of the first and  
12 second memory modules; and

13 a second connector that engages contacts at the second ends  
14 of the first and second memory modules.

15 The Examiner rejects claim 21 based on the same arguments as claim 7  
16 citing Dell and Clayton. Applicants reassert the arguments above supporting  
17 claim 7 and particularly as discussed above, that the combination of Dell and  
18 Clayton does not disclose or suggest connectors that couple channel portions.

19 Dell describes two dissimilar edges, a DIMM edge and a SIMM edge of the  
20 memory module. There is no suggestion or teaching that the DIMM edge of a first  
21 memory module may be connected to a DIMM edge of second memory module,  
22 while the SIMM edge of first memory module is connected to the SIMM edge of  
23 the second memory module. Dell discloses that only one edge (DIMM or SIMM)  
24 may be connected at a time to a computer architecture, therefore connecting  
25 SIMM edges of two memory modules while connecting DIMM edges of the  
memory is precluded by the configuration that is disclosed in Dell.

1 For at least these reasons, the combination of Dell and Clayton does not  
2 suggest the elements of claim 21. Accordingly, the rejection of claim 21 is  
3 improper, and should be withdrawn.

4 **Dependent claim 23** depends from and comprises all the elements of claim  
5 21. As such, dependent claims 23 is allowable by virtue of its dependency on base  
6 claim 21. Applicants respectfully request that the §103 rejection of claim 23 be  
7 withdrawn.

8 **Claim 24** recites in part:

9 arranging channel portions on a substrate such that the  
10 channel portions extend between opposite edges of the substrate;

11 arranging contacts at the opposite edges of the substrate to  
12 allow communication between the contacts at the opposite edges  
through the channel portions;

13 arranging channel portion conductors such that the length of  
14 the channel portion conductors between opposite edges of the  
substrate is approximately equal; and

15 coupling together a pair of such substrates using a connector,  
16 a channel extending across the pair of substrates and the connector.”

17 The Examiner rejects claim 24 based on the same arguments as claim 7  
18 citing Dell and Clayton. Applicants reassert the arguments above supporting  
19 claim 7, in support of claim 24, particularly as discussed above, that the  
20 combination of Dell and Clayton does not disclose or suggest arranging contacts at  
21 opposite edges to allow communication.

22 Although Dell may suggest or teach that memory modules may be  
23 connected to a computer architecture, Dell does not disclose contacts at the  
24 opposite edges of the substrate to allow communication between the contacts at  
25

1 the opposite edges through the channel portions. In other words, when a DIMM  
2 side is inserted, communication to the SIMM side is precluded.

3 For at least these reasons, the combination of Dell and Clayton does not  
4 suggest the elements of claim 24. Accordingly, the rejection of claim 21 is  
5 improper, and should be withdrawn.

6 **Dependent claims 25-30** depend from and comprise all the elements of  
7 claim 24. As such, dependent claims 25-30 are allowable by virtue of their  
8 dependency on base claim 24. Applicants respectfully request that the §103  
9 rejection of claims 25-30 be withdrawn.

10 **Independent claim 31** recites in part:

11 one or more board connectors that engage the contacts at the  
12 first ends of the first and second memory modules to allow  
13 communications through the one or more communication channel  
portions of the memory modules;

14 a coupling that engages the contacts at the second ends of the  
15 first and second memory modules, the coupling being configured to  
16 communicatively couple the one or more channel portions of the  
17 first and second memory modules and to thereby form one or more  
communication channels that each comprise at least one of the  
18 communication channel portions of the first memory module and at  
least one of the communication channel portions of the second  
memory module.

19  
20 The Examiner rejects claim 31 based on the same arguments as claim 7  
21 citing Dell and Clayton. Applicants reassert the arguments above supporting  
22 claims 7, 21, and 24, in support of claim 31.

23 Applicants respectfully request that the §103 rejection of claim 31 be  
24 withdrawn.  
25



1        **Dependent claims 32-33** depend from and comprise all the elements of  
2 claim 31. As such, dependent claims 32-33 are allowable by virtue of their  
3 dependency on base claim 31. Applicants respectfully request that the §103  
4 rejection of claims 32-33 be withdrawn.

5        **Independent claim 34** recites in part:

6                one or more communication channel portions extending  
7 across the module between the contacts, the one or more  
8 communication channel portions being configured to allow  
9 communications through the contacts with the one or more memory  
10 devices.

11        The Examiner rejects claim 34 based on the same arguments as claim 7  
12 citing Dell and Clayton. Applicants reassert the arguments above supporting  
13 claim 7 and 21, in support of claim 34.

14        Applicants respectfully request that the §103 rejection of claim 34 be  
15 withdrawn.

16        **Dependent claims 35-38** depend from and comprise all the elements of  
17 claim 34. As such, dependent claims 35-38 are allowable by virtue of their  
18 dependency on base claim 34. Applicants respectfully request that the §103  
19 rejection of claims 35-38 be withdrawn.  
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**Conclusion**

It is respectfully submitted that all claims are in a condition for allowance, and action to that end is requested. The Examiner is requested to telephone the undersigned if that would be helpful in expediting allowance.

Respectfully Submitted,

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